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EXAMINER

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ART UNIT PAPER NUMBER

2615

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/249,463	<b>Applicant(s)</b> IIZUKA, TETSUYA	
	<b>Examiner</b> Nhan T. Tran	<b>Art Unit</b> 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Argument*

1. Applicant's arguments with respect to claims 1-12 have been considered but claims 1-10 are moot in view of the new ground(s) of rejection, claims 11 & 12 are persuasive.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawamura (US 6,185,270).

Regarding claim 1, Kawamura discloses a method of driving a solid state-imaging device comprising the steps of:

mixing signal charges of pixels (R1 + R2 as shown in Fig. 13) that are separated from each other in horizontal direction of a common row (i.e., a common row containing R1, G1, R2, G2, R3, G3... according to RGB Bayer arrangement shown in Fig. 8; col. 7, lines 36-37 and col. 2, lines 32-35), wherein the signal charges are transferred to a horizontal register (6; Fig. 9) from a vertical register (5) and the mixing occurs within said horizontal register (Fig. 13); and

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transferring the mixed signal charge in the horizontal direction, wherein the mixed signal is comprised of signal charges that are originally generated by pixels separated by at least one intervening pixel (i.e., G1) in the row whose signal charge is not included in the mixed signal ( $R1 + R2$ ). See Figs. 9-14; col. 1, lines 5-15 and col. 5, line 50 – col. 6, line 46, wherein signal charges R1, G1 are shifted to the horizontal register 6 and then shifted to the left such that R1 coincides with R2, and G1 coincides with G2 of the same row at electrode H1B and then R1 and R2 are mixed; also, G1 and G2 are mixed.

Regarding claim 2, Kawamura also discloses that after said signal charges of pixels (i.e., R1 & R2) distant from each other on said one row (by G1) are separately transferred from said vertical register (5) to said horizontal register and one signal charge (R1) is transferred to said horizontal register (6), said one signal charge is transferred within said horizontal register and the other signal charge (R2) is transferred to said horizontal register, in which said signal charges are mixed. See Figs. 9-14; col. 1, lines 5-15 and col. 5, line 50 – col. 6, line 46.

Regarding claim 3, Kawamura also discloses that when said signal charges of pixels (i.e., R1 & R2) distant from each other on said one row are transferred from said vertical register to said horizontal register, said signal charges are transferred at every said vertical register. See Figs. 9-14 and col. 5, line 50 – col. 6, line 60.

Regarding claim 4, it is clear that the pixel has a color filter thereon (Fig. 8) and pixels distant from each other on said one row are same in color (i.e., R color or G color as analyzed in claim 1).

Regarding claim 5, Kawamura discloses a solid-state imaging element having a photo-electric conversion means (pixels) for photo-electric converting incident light to a signal charge and a vertical transferring means (5) for transferring said signal charge in a vertical direction and a horizontal register (6) for receiving and transferring said signal charge transferred by said vertical transferring means in a horizontal direction, further comprising: a transfer gate unit (whole unit of  $\phi V1$ ,  $\phi V2A$ ,  $\phi V3A$ ,  $\phi V2B$ ,  $\phi V3B$ ) between said vertical transferring means (5) and said horizontal register (6), and a transfer electrode of a first and a second phase (electrode of first phase is indicated by  $\phi V2B$  &  $\phi V3B$  and electrode of second phase is indicated by  $\phi V2A$ ,  $\phi V3A$ ), of said transfer gate unit, are disposed alternately at every set of prescribed columns (2 columns) of said vertical transferring means wherein pixels corresponding to each set of said prescribed column(s) of said vertical transferring means have a same color arrangement (i.e., same R color), such that signal charges of non-adjacent pixels (R1 and R2 separated by G1 according to Bayer arrangement, see claim 1) having common colors from a single row are mixed (R1+R2, G1+G2, etc). See Figs. 9-14; col. 1, lines 5-15 and col. 5, line 50 – col. 6, line 60.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura (US 6,185,270) in view of Ishigami (US 6,198,507).

Regarding claim 6, Kawamura discloses a camera (col. 1, line 23) having all limitations of claim 6 for a first mode (see claims 1 & 5) except for explicitly disclosing that the camera operates in a second mode in which the register charges are separately transferred in a horizontal direction as a signal charge of each pixel without being mixed with the horizontal register, said first and second modes are switchable. However, Kawamura discloses a resolution change-over mode (col. 3, line 65 – col. 4, line 8) which indicates that the camera has at least two different operating modes.

As taught by Ishigami, a camera (Figs. 13 & 14) is operated in two different modes. In a first mode (interlace mode –  $S_{IL}$ ), signal charges of pixels distant from each other are transferred to horizontal register and are mixed together (Figs. 12A-12C). In a second mode, (noninterlace mode –  $S_{NIL}$ ) signal register charges are separately transferred in a horizontal direction as a signal charge of each pixel without being mixed within the horizontal register, wherein the first and second modes are switchable (see col. 17, lines 6-26, wherein the noninterlaced signal presents the signal charge of each pixel without being mixed).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enhance the camera in Kawamura by implementing a second operating mode (noninterlace mode) in which the register charges would be separately transferred in a horizontal direction as a signal charge of each pixel without being mixed with the horizontal register and that the first and second modes would be switchable so that the camera would be highly operable by outputting noninterlaced image signal (without mixing) into a memory or displaying an interlaced image signal (mixed signal) on a monitor (see Ishigami, col. 9, lines 56-66).

Regarding claim 7, see the analysis of claim 2 in section 2.

Regarding claim 8, see the analysis of claim 3 in section 2. Additionally, Kawamura shows that the signal charges are transferred at every vertical register of adjacent constant columns (Figs. 9-13).

Regarding claim 9, see the analysis of claim 4 in section 2.

Regarding claim 10, see the analysis of claim 5 in section 2.

4. Claims 1-4, 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art in view of Ishigami (US 6,198,507).

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Regarding claim 1, the Admitted Prior Art (Fig. 2) discloses a solid state imaging device comprising the steps of: mixing signal charges of pixels (i.e., G11 & G13) that are separated from each other (by R12 in view of the color arrangement as shown in Fig. 2, wherein the empty row below G21 is inherently including G11 R12 G13 G14...so on in consistent with such color filter arranged in the order as shown) in the horizontal direction of a common row, wherein signal charges are transferred to a horizontal register (PH) from a vertical register (inherent by virtue of Fig. 2); wherein the mixed signal is comprised of signal charges that are originally generated by pixels (i.e., G11 & G13) separated by at least one intervening pixel (R12) in the row whose signal charge is not included in the mixed signal. See Fig. 2 and Specification, pages 3-5 for method (2) for reducing horizontal resolution by adding pixel signals of same color that are separated by one intervening pixel.

The Admitted Prior Art does not specifically mention that the mixing (adding) occurs within the horizontal register and transferring the mixed signal charge in the horizontal direction. However, as taught by Ishigami, it is well known that mixing of non-adjacent pixels of same color can take place in a horizontal register (Figs. 12A-12C) so that use of a frame memory or an external circuit is eliminated (see col. 4, lines 1-12 and col. 5, lines 44-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Admitted Prior Art by mixing signal charges G11 with G13, and also mixing signal charges R12 with R14 and so on in the horizontal register so as to eliminate use of a frame memory or an external circuit, thereby reducing cost.



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Regarding claim 2, as shown in Fig. 2 in the Admitted Prior Art, it is clear that signal charge of G13 is transferred into the horizontal register and then shifted to the left such that G13 coincides with G11 which is also shifted into the horizontal register at another predetermined time. Signals G11 and G13 are mixed in the horizontal register in view of the combination of Admitted Prior Art and Ishigami as analyzed in claim 1 above.

Regarding claim 3, apparently shown in Fig. 2 in the Admitted Prior Art and/or Figs. 12A-12C in Ishigami, said signal charges of pixels distant from each other on said one row are transferred from said vertical register to said horizontal register, said signal charges are transferred at every said vertical register.

Regarding claim 4, Admitted Prior Art also discloses (Fig. 2) the pixel has a color filter thereon and pixels distant from each other on said one row are same in color (G11 & G13, and R12 & R14).

Regarding claim 6, the combination of Admitted Prior Art and Ishigami discloses a camera (see Ishigami in Figs. 13 & 14 for a camera circuitry) comprising: a solid-state imaging device which has a two-dimensional pixel array provided with a photo-electric conversion unit for photo-electric converting incident light to a signal charge and a vertical register for transferring said signal charge or a vertical register having a photo-electric conversion function for transferring a signal charge and a horizontal register for receiving and transferring said signal charge transferred by said vertical register (see Admitted Prior Art in Fig. 2), said camera

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operating in a first mode (interlaced mode which corresponds to mixing mode) in which signal charge of pixels separated from each other in the horizontal direction of a common row are transferred from said vertical register and to said horizontal register and are mixed within said horizontal register, said mixed signal charge is transferred in a horizontal direction and output, such that the mixed signal is comprised of signal charges that are originally generated by pixels separated by at least one intervening pixel in the row whose signal charge is not included in the mixed signal (see the analysis of claim 1), and said camera operating in a second mode (noninterlace mode) in which said register charges are separately transferred in a horizontal direction as a signal charge of each pixel without being mixed within said horizontal register, said first and second modes being switchable. See Ishigami, col. 17, lines 6-26, wherein the noninterlaced signal presents the signal charge of each pixel without being mixed.

Regarding claim 7, see the analysis of claim 2 in section 4.

Regarding claim 8, see the analysis of claim 3 in section 4. Additionally, the Admitted Prior Art shows that the signal charges are transferred at every vertical register of adjacent constant columns (Fig. 2).

Regarding claim 9, see the analysis of claim 4 in section 4.

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5. Claims 5 & 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art in view of Ishigami (US 6,198,507) and in further view of Takahashi et al (US 6,288,744).

Regarding claim 5, the Admitted Prior Art in view of Ishigami discloses all limitations of claim 5 as analyzed in claim 6 in section 4 (note that transfer gate unit VH1, VH2 between vertical transferring means and horizontal transferring means is also disclosed in Ishigami, Fig. 5; col. 11, lines 13-35) except for explicitly disclosing that the transfer electrode of a first and a second phase (shared shift registers) of transfer gate unit are disposed alternately at every set of prescribed column(s) of the vertical transferring means. However, Takahashi teaches an implementation of shared shift registers (133, 134) in solid-state imaging device to enable signal charges in channel regions of vertical registers on different columns to be made different from each other in a direction along the vertical shift registers (see Takahashi, Fig. 8., col. 11, lines 43-53).

Therefore it would have been obvious to one of ordinary skill in the art to modify the Admitted Prior Art and Ishigami to include the teaching of the shared shift registers by Takahashi in the solid-state imaging device to enable the signal charges in the channel regions of the vertical registers on different columns to be made different from each other in a direction along the vertical shift registers as an alternate configuration to reduce the number of transfer electrodes.

Regarding claim 10, see the analysis of claim 5 in section 5.

*Allowable Subject Matter*

6. Claims 11 & 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 11, the prior art of record fails to teach or fairly suggest that the method of driving a solid-state imaging device of claim 1 further comprises inserting between groups of signal charges from a first row, a mixed signal from charges of non-adjacent pixels in a row above.

Regarding claim 12, the prior of record also fails to teach or suggest that the horizontal register in the first mode operates such that a mixed signal of charges from non-adjacent pixels of a row above are located between groups of signal charges from a first row.

*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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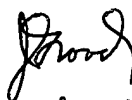
will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (571) 272-7371. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Groody can be reached on (571) 272-7950. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.

  
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